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THE EFFECT OF GIVING HONEY TO DECREASE THE PAIN SCORES CAUSED DUE TO INVASIVE INTRAVENOUS BLOOD TREATMENT OF CHILDREN IN EMERGENCY ROOM

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ABSTRACT

Intravenous blood collection can cause pain and trauma in children. This study aims to identify the effect of honey on child pain scores when taking blood. The design of this study is quasi-experimental. Samples were taken by consecutive sampling, consisting of intervention groups who received honey orally (34 respondents) and the control group received placebo (34 respondents). The age of respondents was 1-6 years. Pain scores were evaluated by the Children's Hospital of the Eastern Ontario Pain Scale (CHEOPS). The results of the analysis showed that there were significant differences in the mean of children's pain scores in the honey group and the placebo group ($p=0.001$). Researchers concluded that giving honey orally can reduce pain scores in children when taking intravenous blood.

Keywords: Honey, Intravenous Blood Taking, Pain Score

INTRODUCTION

Pain is an unpleasant feeling and emotional experience that is related to the reality or potential for tissue damage or images related to tissue damage (Uman *et al.*, 2008, Cohen, 2008). The journey of pain includes a series of complex neurophysiological processes called nociception (nociception) which reflects four real component processes, namely transduction, transmission, modulation and perception, where a strong stimulus occurs peripherally until the pain is felt in the central nervous system (cortex cerebri) (Kleiber *et al.*, 2002; Uman *et al.*, 2008; Zempsky, 2008, Cohen, 2008).

Pain in the child is interpreted and expressed through behavior (crying, grinning face, flexion and extension of motion devices) and physiological changes (changes in heart rate, respiratory rate, and changes in blood chemistry). Children with pain conditions show various complications such as long-term anxiety, despair, behavioral disorders, psychosocial and physiological disorders. These complications can

reduce the quality of life (Cohen, 2008; Kleiber *et al.*, 2002, Zempsky & Schecter, 2003).

Invasive actions that children get in an emergency room can cause prolonged trauma. One of the acts of invasion is taking intravenous blood, which is a procedure that causes anxiety and fear and a sense of discomfort among children due to the pain felt when the procedure is carried out. Pain and anxiety control for children entering the emergency department is important and must be considered because it can cause trauma in children (Petersen, Hagglof & Bergstrom, 2009, Curtis *et al.*, 2007).

A painful action is a stressor for children of all ages. Children who enter the hospital will appear fearful because they face something new that they have never experienced before, a sense of insecurity, and discomfort, a feeling of loss of something, and something that feels painful. Pain in children can cause a decrease in quality of life, where the results of the study show that two-thirds of the samples reported in children who experience recurrent pain have decreased the quality of life four

times compared to children with no pain (Petersen, Hägglöf & Bergström, 2009; Czamecki *et al.*, 2011).

The method of pain reduction is one of the basic principles of child nursing, namely the principle of a traumatic care or prevention of trauma. Nurses are responsible comprehensively in providing child nursing care for the welfare of children. The principle of atraumatic care is a treatment that does not cause trauma to children and families (Wong, Hockenberry & Wilson, 2007). Adequate pain management, in addition to aiming to reduce anxiety in children and parents, will also increase closeness and cooperation between patients and nurses when providing interventions so as to reduce the burden on nurses in providing services. Interventions to reduce pain can be done multidimensional through an interdisciplinary treatment approach, which is a combination of pharmacological, cognitive, psychological and non-pharmacological treatment that aims to provide interventions that's loving, effective and timely (Wong, Hockenberry & Wilson, 2007; Czamecki *et al.*, 2011).

Nursing interventions are needed to prevent trauma because the pain in children can be done in the form of pharmacological intervention or non-pharmacological intervention. Examination and treatment of pain in children is an important component in the practice of daily child health services. The approach by using non-pharmacological interventions to reduce other pain responses is carried out, some studies have proven that non-pharmacological interventions can reduce pain due to invasive action (Zempsky & Schechter, 2003; Zempsky, 2008; Breau *et al.*, 2002; Carbajal *et al.*, 1999)

A number of non-pharmacological measures can be taken to reduce pain in children, such as information giving, distraction, relaxation, guided imagery, hypnotherapy, sweetness and a comfortable environment can reduce pain response in children (Taddio *et al.*, 2010; Ozcetin *et al.*, 2011). Non-pharmacological therapy in the form of sweetness such as sucrose and glucose has often been carried out, some research results show that the sweet taste of sucrose and glucose can reduce pain response in infants and children (Akanmu *et al.*, 2011; Carbajal *et al.*, 1999; Gradin *et al.*, 2002; Harrison *et al.*, 2015).

Honey is a natural liquid that generally has a sweet taste. It is produced by honey bees from plant flower extracts (floral nectar) or other parts of the plant

(extrafloral nectar) or insect excretion (Bogdanov *et al.*, 2008, Alvarez *et al.*, 2010). Honey contains several organic compounds that have been identified, such as polyphenols, flavonoids, and glycosides. In addition, there are also various types of enzymes in honey, including glucose oxidase enzymes and invertase enzymes which can help the processing of sucrose to be converted into glucose and fructose, both of which are easily absorbed and digested by the body (Sporns, Plhak & Friedrich, 1992; Bogdanov, 2009, Alvarez *et al.*, 2010). Additional components contained in honey such as lysozyme, acids phenolic and flavonoids are also found in honey which functions as an antioxidant and anti-inflammatory. Content is Flavonoid suspected inhibits production cyclooxygenase, so it can be used to relieve pain (Martos *et al.*, 1997, Afroz *et al.*, 2016)

Non-pharmacological interventions for administering honey orally have never been given related to a decrease in pain response in children. Therefore, the authors are interested in examining the effect of honey on reducing the pain response in children due to the action of taking venous blood in children in the Emergency Room (Martos *et al.*, 1997).

RESEARCH METHODOLOGY

This study uses a Quasi-Experimental design which is of Nonequivalent Control group. Data collection was carried out at the emergency unit of Gunung Jati Hospital and Arjawinangun Hospital in Cirebon City. The inclusion criteria in this study were children aged 1-6 years (divided into two age groups 1-3 years and > 3-6 years old), intravenous blood collection was taken, children those who were able to communicate verbally and non-verbally were taken for the experiment and those family who are willing to become respondents were considered for the experiment. A child will be excluded from the experiment if the condition of the child is very weak and he/she experiences impaired consciousness. Sampling in this study is based on non-probability sampling type of consecutive sampling. The total number of samples needed after adding drop outs was 68 respondents consisting of 34 respondents and the intervention group and 34 respondents in the control group (Polit & Beck, 2004; Polit & Beck 2008; Burns & Grove, 2010)

Pain scores were measured using the Children's Hospital of the Eastern Ontario Pain Scale (CHEOPS) (Hesselgard *et al.*, 2007). Questionnaire, with a test previously performed interobserver reliability between

assessments of pain scores. Pain Scores are rated based on video recordings. Respondents in the intervention group were given honey orally and the control group was given a placebo (whitewater). Honey is given to children aged 1-3 years 3 cc and > 3-6 years 5 cc (giving honey based on a Young formula). Honey is given orally using a small glass, given 2 minutes before taking blood. Video recording is done when stabbing the needle and recording the response that appears to the child when the needle is inserted. Honey that is given is PERHUTANI honey with multiflora type, honey concentration is given 50%. Honey and water are mixed in a ratio of 1: 1.

RESULTS

The results show that the number of characteristics age of toddlers and preschool for each respondent in the intervention group and the control group had the same amount (50%). Based on the gender characteristics, the group intervention mostly had male sex 52.9% and in the control group, the male and female sex characteristics had the same amount of 50%. Based on previous experience characteristics the intervention group had the same amount (50%) and in the control group most had a history of blood taken before (55.9%). Based on overall parental attendance characteristics the intervention group (97.1%) and the control group (91.2%) were accompanied by parents during the blood collection process.

Table 1: Characteristics of research respondents

variables	Control (n = 34)		Interventions (n = 34)	
	F	%	f	%
Age				
1 - 3 years	17	50	17	50
> 3-6 years	17	50	17	50
Gender				
Male	18	52.9	17	50
Female	16	47.1	17	50
Previous experience				
There is history	17	50	19	55.9
First time	17	50	15	44.1
Presence of parents				
Present	31	91.2	33	97.1
Not present	3	8.8	1	2.9

The results of the analysis showed that the mean pain score in the intervention group was 8.8 with the lowest pain score being 5 and the highest score 13 was

by the pain scale are Children's Hospital of the Eastern Ontario Pain Scale (CHEOPS)

Table 2: Pain respondent score

Variable	Group	Mean	n	Minima#Maximum
Pain Score	Honey	8.8	34	5-13
	Placebo	10.5	34	6-13

While the average pain score in the control group was 11 with the lowest pain score 6 and the highest score 13. The mean comparison of pain scores between the control group and the intervention group based on age characteristics is shown in table 3.

Table 3: Average pain score of the intervention group and control group based on age characteristics

Variable	n	Score Pain		p-value	
		Honey	Placebo		
Age	Toddlers	17	9.1	11.5	0.002 *
	Preschool	17	8.5	9.7	0.140

The results of table 3 analysis showed that there were significant differences in mean scores of pain depending on toddlers' age between the control group and the intervention group (p-value=0.002) while the average pain score in preschool age was no significant difference between the intervention group and the control group (p-value=0.140).

The mean comparison of pain scores between the control group and intervention group based on gender characteristics.

Table 4: The mean pain score of the intervention group and control group based on gender characteristics

Variable	n	Score Pain		p-value	
		Honey	Placebo		
Gender	Male	35	9.5	10.7	0.045 *
	Female	33	8.1	10.3	0.002 *

Results of analysis of table 4, show that there is a significant difference in the average male pain score (p-value=0.045) and women (p-value=0.002) between the control group and the intervention group.

The mean comparison of pain scores between the control group and the intervention group based on the characteristics of pain experience is shown in Table 5.

Table 5: The mean pain score of the intervention group and the control group based on the characteristics of the pain experience

Variable	n	Pain score		p-value	
		Honey	Placebo		
Experience of pain	Ever	36	9.1	10.8	0.016 *
	Never	32	8.5	10.2	0.029 *

Results of analysis of table 5, shows that there is a significant difference in the average pain score having previous pain experience (p-value 0.016) and that have no experience (p-value 0.029) between the control group and the intervention group.

The mean comparison of pain scores between the control group and the intervention group based on the characteristics of parental presence is shown in Table 6.

Table 6: The mean pain score of the intervention group and the control group based on the characteristics of parental presence

Variable	n	Pain score		p-value	
		Honey	Placebo		
The presence of parents	Present	64	8.9	10.8	0.000 *
	Not present	4	7	7.7	1.000

Results of analysis of table 4, showed that there were significant differences in the mean pain scores in the group attended by parents between the control group and the intervention group (p-value 0.000) while the average pain score in the group that was not attended by parents there was no significant difference between the intervention group and the control group (p-value 1.000).

DISCUSSION

From the results of this study, it was found that the age of respondents in this study group 1-6 years was in the age group ranging from 1-3 (toddler) and >3-6 (preschool). Based on the recommendation of the National Honey Board, provision of giving honey to the respondents over the age group of 1 year prevents botulism, a rare poisoning caused by the bacteria called Clostridium botulinum (Bogdanov, 2009; Purcarea & Chis, 2011).

The researchers found that the average pain score showed no difference in pain level at this age. Pain scores among toddlers were higher (9.1 group intervention and the control group 11.5) than the score age of preschool (group 8.5 intervention and 9.7 control

group). This is because the development of children's age affects the meaning of pain and its differences in average pain score differed depending on the child's age. The expression of pain among the toddler has been different from the pain response given by preschool age groups. Differences in age levels and developments found between these age groups can affect how children react to pain (Taylor *et al.*, 1995; Sparks, Setlik & Luhman, 2007).

Pain response in children changes with age. A toddler response to pain is more expressive than the preschool, whereas the toddler is still unable to describe the specific pain felt due to his/her limited vocabulary and reason motor abnormalities that occurs during this stage. A toddler is able to push a stimulus away after the painful experience of pain while a preschool asks to end actions that cause pain and the child is able to encourage a source of pain.

From the results of the analysis between the sexes and the pain score at the time of blood collection, the researchers found that the pain score in the male intervention group was slightly higher than that of women whereas in the control group the pain score between men and women was almost the same. Researchers assumed that this might be influenced by differences in age groups of children studied, but based on the results of statistical tests of gender characteristics showed that there were significant differences in the average pain score on the characteristics of the sexes of men and women (men p-value 0.045 and women p-value 0.002) in the intervention group and the control group.

Research explains that pain tolerance among women and men is the same and will develop at the age of puberty and tolerance to pain is influenced by biochemical factors and is unique to each individual regardless of gender (Perquin *et al.*, 2000; Guinsburg *et al.*, 2000). The difference between boys and girls does not significantly affect the pain response, in the study more explained gender differences only because of sensitivity, the experience of expression and situational conditions that influence and how children respond to pain (Guinsburg *et al.*, 2000, Young, 2005, Won, 2006, Cohen, 2008).

The difference in the mean pain score in the previous pain experience showed that almost all respondents had previous pain experiences, and the researchers assumed that previous experience was related to the age of the respondents where the age

range was toddler and preschool. This age is very susceptible to disease, crisis and hospitalization (Terstegen *et al.*, 2003; Stinson *et al.*, 2006). A history of previous illness or hospitalization may cause an experience of previous pain in the child.

Judging from the test statistics of the average pain score on pain experience between the intervention group and the control group, it was found that there were significant differences in those who had never experienced pain before and who had experienced pain previous (never p -value 0.016 and never p -value 0.029). Previous experience has an effect on one's perception of pain, who experiences individuals with pain experienced before will cause feelings of fear in individuals when facing the next painful event (von Baeyer & Spagrud, 2007). The results of the study of pain scores in the presence of parents showed that in the intervention group (97.1%), and in the control group (91.2%), almost all respondents were accompanied by parents. This shows that the presence of parents when children experience hospitalization plays an important role. The presence of parents is very important for children who are experiencing pain. The presence of family members is able to provide support and comfort in children so that children feel calmer and less pain.

Statistical test results showed that there was a significant difference in the average pain score with the presence of parents (p -value 0.000) while there was no significant difference in the absence of parents (p -value 1.000). This is supported by the concept of Potter & Perry, (2004) theory that the presence of parents is very important for children who are experiencing pain. Individuals who experience pain often depend on family members for support, help or protection. The presence of the family greatly affects the pain response in children. The results of the study stated that the average pain score in children accompanied by parents was lower than those accompanied by health workers. The conclusions of the study showed that the presence of parents has a positive effect on children's pain tolerance (Cohen, 2008).

One application of comfort theory in child nursing is that parental involvement can meet psychosocial comfort needs and at the same time comfort the environment for children, because parents are known individuals, not foreigners to children, so they can reduce anxiety and have a positive impact on fulfillment of physical comfort for children (Cohen, 2008; Lumley *et al.*, 2011).

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This study illustrates that there is a difference in the average pain score between the intervention groups during the blood collection procedure with the control group, p -value 0.001 (<0.05). This is probably caused by several factors, namely; sweetness in honey, the content of glucose and sucrose in honey may give a pleasant effect which can reduce pain or cause by the enzyme flavonoid in honey. The analgesic effect of sweetness is thought to cause a beta release of endorphin (a hormone of endogenous opiates produced by the body and similar to morphine) and the mechanism of reabsorption of sweetness. Sweetness that can stimulate neurotransmitters that play a role in pain suppression and release endogenous opiates in the pituitary gland such as endorphins, as well as serotonin and GABA (gamma amino butyric acid) which serves to reduce the sensation of pain, while content flavonoid in honey blocks the action of enzymes cyclooxygenase which inhibits the release of substances prostaglandin (Candiracci *et al.*, 2002; Truchado *et al.*, 2009; Kumar & Pandev, 2013).

Flavonoids in honey can relieve pain. Flavonoids can prevent the production of the enzyme cyclooxygenase (COX), flavonoid has two effects as analgesic and anti-inflammatory. The Enzyme cyclooxygenase (COX) is an enzyme that catalyzes prostaglandin synthesis from arachidonic acid. Flavonoids block the action of the COX enzyme which decreases the production of prostaglandin mediators. This prostaglandin will cause sensitization of nociceptive receptors and the release of pain mediators such as histamine and serotonin which will cause pain sensation. This situation is known as peripheral sensitization (Almada, 2000; Truchado *et al.*, 2009; Hussein *et al.*, 2012; Kumar & Pandev, 2013).

Nursing interventions are very important in reducing pain in children who are carried out invasive blood taking, one of which is giving honey. Application Comfort theory in handling pain due to an invasive action of blood taking in children can be explained that the aspect of healthcare need is that children have a sense of comfort during invasive procedures. The aspect of nursing intervention is the provision of non-pharmacological interventions in the form of giving honey which is part of a nursing intervention to meet the needs of comfort (Wong, Hockenberry & Wilson, 2007; Uman *et al.*, 2007).

Intravenous Blood Collection is an invasive procedure that causes pain in children. Pain responses that are not handled properly can cause prolonged child

trauma. Handling of pain in children can be done with various interventions. The results of this study indicate that one of the interventions to reduce pain is easy and inexpensive, but the act of giving honey orally is proven effective. During this time the implementation of reducing pain in children tends to be less noticed. Various research results show that pain in children will cause disruption in the child's quality of life.

Application of easy interventions that can be used in reducing pain is still not well socialized for nurses and parents. So far various types of analgesic drugs have been used to reduce pain in children such as paracetamol, ibuprofen, and others, whereas various studies do not recommend the use of these drugs for a long time because of the risk of gastric irritation, and liver damage and allergies. Honey is also a substance that is very well known by the family and easily available.

Prevention of a traumatic care is the responsibility of the pediatrician nurse responsible for providing quality nursing care by preventing the occurrence of pain in children so that the expected state of trauma in children can be minimized and children can live prosperously and lead a quality life. Nurses, especially pediatric nurses, are responsible for innovating during child care. The provision of nursing care carried out by pediatric nurses must be scientific and innovative. The

results of this study can be used as one of the innovations in nursing care to reduce pain in invasive actions.

CONCLUSION

The mean pain score in the group of children given honey at blood sampling was 8.8 and the average pain score in the group of children who were given a placebo when blood was taken was 10.5. There is a difference in the average pain score between the intervention group and the control group with a p -value of 0.001. There is a difference in the average pain score in the intervention group and the control group with the characteristics of the child, especially the characteristics of age and the presence of parents.

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